

WE CLAIM:

1. A method for dynamic assignment and validation of IP addresses in a wireless IP network, comprising the following steps:

- 5 broadcasting IP messages from a mobile terminal to the wireless network;
- determining whether the IP messages are one of assignment request messages and validation request messages based on IP headers of the received IP messages;
- 10 determining origination of the received request messages based on the IP address headers of the received request messages; and
- selectively forwarding the received request messages to a server without transmitting the request messages to other mobile terminals which are actively communicating with base stations and to base stations which reside on a wired
- 15 IP network based on the origination of the request messages.

2. The method of claim 1, further comprising the following step:

- broadcasting non assignment messages and non validation messages based on the IP headers of the received IP messages; and
- 20 returning to the step of broadcasting IP messages from the mobile terminal.

3. The method of claim 2, wherein destination addresses in IP addresses are broadcast addresses.

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4. The method of claim 1, wherein said step of determining the IP messages are one of assignment messages and validation messages comprises the following step:

determining whether a source IP address and a destination IP address are broadcast addresses.

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5. The method of claim 1, wherein a base station receives the broadcasted messages.

6. The method of claim 1, wherein the servers are DHCP servers, and the mobile terminals are clients of the DHCP servers.

7. The method of claim 1, wherein the assignment messages and validation messages are *DHCPDISCOVER* and *DHCPREQUEST* messages, respectively.

8. The method of claim 1, further comprising the following step:

triggering an IP address validation when the mobile terminal enters a new subnet.

9. The method of claim 8, wherein said triggering step comprises the following step:

initiating a mobility daemon when the mobile terminal enters the new subnet.

10. The method of claim 9, wherein said step of initiating the mobility daemon comprises the following steps:

resetting an IP address of the mobile terminal to a null address;

broadcasting a validation request message from the mobile terminal to
an IP address server of the new subnet;

determining whether a former IP address of the mobile terminal is valid
in the IP address server of the new subnet;

5 transmitting a validation message for the former IP address to the mobile
terminal;

receiving the validation message for the former IP address at the mobile
terminal;

determining whether the former IP address is valid based on the
validation message for the former IP address received by the mobile terminal;
and

setting the IP address of the mobile terminal from the null address to the
former IP address if the former IP address is valid.

10 11. The method of claim 10, further comprising the following steps:

requesting a new IP address which is valid for the new subnet;

assigning a new, valid IP address to the mobile terminal based on the
request for the new, valid IP address;

transmitting the new, valid IP address to the mobile terminal; and

15 20 setting the IP address of the mobile terminal to the new, valid IP
address.

22 12. The method of claim 11, wherein said step of requesting a new IP address
comprises the following step:

broadcasting an assignment request message to an IP address server in the IP network.

13. A method for dynamic assignment and validation of IP addresses in a wireless

5 network, comprising the following steps:

broadcasting IP messages from a mobile terminal to a wireless interface;

determining whether header information in one of assignment request messages and validation request messages in received IP messages is a local broadcast IP address;

10 determining whether the IP messages were received on one of the wireless interface and a wired interface if the header information indicates a broadcast IP address; and

15 if the header information indicates a broadcast IP address, then discarding the received IP messages, else broadcasting the received IP messages to the wired interface.

14. The method of claim 13, further comprising the following steps:

broadcasting non assignment messages and non validation messages based on the IP headers of the received IP messages; and

20 returning to the step of broadcasting IP messages from the mobile terminal.

15. The method of claim 13, wherein destination addresses in IP addresses are broadcast addresses.

16. The method of claim 13, wherein said step of determining the IP messages are one of assignment messages and validation messages comprises the following step:

determining whether a source IP address and a destination IP address are broadcast addresses.

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17. The message of claim 13, wherein a base station receives the broadcasted messages.

18. The method of claim 13, wherein the servers are DHCP servers, and the mobile terminals are clients of the DHCP servers.

19. The method of claim 8, wherein the assignment messages and validation messages are *DHCPDISCOVER* and *DHCPREQUEST* messages, respectively.

20. The method of claim 13, further comprising the following step:

triggering an IP address validation when the mobile terminal enters a new subnet.

21. The method of claim 20, wherein said triggering step comprises the following step:

initiating a mobility daemon when the mobile terminal enter the new subnet.

22. The method of claim 21, wherein said step of initiating the mobility daemon comprises the following steps:

resetting an IP address of the mobile terminal to a null address;

broadcasting a validation request message from the mobile terminal to
an IP address server of the new subnet;

determining whether a former IP address of the mobile terminal is valid
in the IP address server of the new subnet;

5 transmitting a validation message for the former IP address to the mobile
terminal;

receiving the validation message for the former IP address at the mobile
terminal;

determining whether the former IP address is valid based on the
validation message for the former IP address received by the mobile terminal;
and

setting the IP address of the mobile terminal from the null address to the
former IP address if the former IP address is valid.

23. The method of claim 22, further comprising the following steps:

requesting a new IP address which is valid for the new subnet;

assigning a new, valid IP address to the mobile terminal based on the
request for the new, valid IP address;

transmitting the new, valid IP address to the mobile terminal; and

20 setting the IP address of the mobile terminal to the new, valid IP
address.

24. The method of claim 23, wherein said step of requesting a new IP address
comprises the following step:

broadcasting an assignment request message to an IP address server in the IP network.

25. A method for dynamic assignment and validation of IP addresses in a wireless IP

5 network, comprising the following steps:

adding a selected mobile terminal address to an address mapping table for a broadcast IP address when one of an assignment request and a validation request from the mobile terminal is received at a base station;

broadcasting at least one of assignment information and validation information from IP address servers to those mobile terminals included in the address mapping table; and

removing a selected mobile terminal address from the address mapping table for the broadcast IP address once the selected mobile terminal has received a valid IP address from an IP address server.

26. The method of claim 25, wherein said adding step comprises the following steps:

creating a broadcast IP address and a corresponding mapping table for transmitting assignment and validation information from IP address servers only to mobile terminals which request the assignment and validation information and for tracking mobile terminals which request assignment and validation information;

awaiting receipt of one of an assignment request and a verification request from the mobile terminal;

extracting a link layer address from one of the assignment request and verification request upon receipt of a request message which identifies the mobile terminal which requested the request message;

adding the link layer address to the address mapping table for the corresponding broadcast IP address; and

returning to the step of awaiting receipt of request messages.

27. The method of claim 25, further comprising the following steps:

identifying the mobile terminal which has requested one of the assignment information and validation information;

awaiting receipt of information via a wired interface;

comparing a source IP address of the received information to an IP address of the IP address server and comparing a destination address of the received information to a broadcast address to determine whether the received information is a broadcast message from a server;

if the received information is a broadcast message from a server, then transmitting the broadcast message, else forwarding the received information to a next appropriate network host based on the destination address of the received information.

28. The method of claim 25, further comprising the following steps:

awaiting receipt of information from a network host whose destination is a unicast IP address of the mobile terminal;

determining whether receipt of the information is a first instance of the unicast IP address addressed to the mobile terminal;

if receipt of the information is a first instance of the unicast IP address addressed to the mobile terminal, then removing the mobile terminal from the address mapping table;

mapping a link layer address of the mobile terminal to an IP address of the mobile terminal;

deleting a previously stored link layer address of the mobile terminal from the address mapping table;

forwarding the received information to the mobile terminal based on the unicast IP address of the mobile terminal; and

awaiting receipt of additional information from the network host.

29. The method of claim 28, further comprising the following steps:

forwarding the received information to the mobile terminal if receipt of the information is not the first instance of the unicast IP address addressed to the mobile terminal; and

awaiting receipt of additional information from the network host.

30. The method of claim 25, wherein the IP address server is a DHCP server.

31. The method of claim 30, wherein the DHCP server broadcasts one of *DHCPOFFER* messages, *DHCPACK* messages and *DCHPNACK* messages in response to one of *DHCPDISCOVER* and *DHCPREQUEST* messages, respectively.

32. The method of claim 25, further comprising the following step:

triggering an IP address validation when the mobile terminal enters a new subnet.

33. The method of claim 32, wherein said triggering step comprises the following step:

5 initiating a mobility daemon when the mobile terminal enter the new subnet.

34. The method of claim 33, wherein said step of initiating the mobility daemon comprises the following steps:

10 resetting an IP address of the mobile terminal to a null address;

15 broadcasting a validation request message from the mobile terminal to an IP address server of the new subnet;

determining whether a former IP address of the mobile terminal is valid in the IP address server of the new subnet;

20 transmitting a validation message for the former IP address to the mobile terminal;

receiving the validation message for the former IP address at the mobile terminal;

25 determining whether the former IP address is valid based on the validation message for the former IP address received by the mobile terminal; and

setting the IP address of the mobile terminal from the null address to the former IP address if the former IP address is valid.

35. The method of claim 33, further comprising the following steps:

requesting a new IP address which is valid for the new subnet;
assigning a new, valid IP address to the mobile terminal based on the
request for the new, valid IP address;
transmitting the new, valid IP address to the mobile terminal; and
5 setting the IP address of the mobile terminal to the new, valid IP
address.

36. The method of claim 35, wherein said step of requesting a new IP address
comprises the following step:

10 broadcasting an assignment request message to an IP address server in the IP
network.